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AMIN, TUROCY & CALVIN, LLP			EXAMINER	
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CLEVELAND, OH 44114			ART UNIT	PAPER NUMBER
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			10/20/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/603,541

**Applicant(s)**

LIND ET AL.

**Examiner**

Dave Robertson

**Art Unit**

3623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 April 2008.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-157 is/are pending in the application.  
4a) Of the above claim(s) 5-100 and 102-149 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-4, 101 and 150-157 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

#### **DETAILED ACTION**

1. This is a Non-final office action in response to Applicant's reply of 4/28/2008. Claims 1-157 are pending. Claims 1-4, 101, and 150-157 are examined herein, claims 5-100 and 102-149 having been withdrawn from further consideration as being drawn to a non-elected invention, and claims 150-157 newly added by amendments,
2. This office action is made non-final over new grounds of rejection under 35 U.S.C. 101 not previously made and not necessitated by Applicant amendment.

#### ***Response to Amendment***

3. Applicant amends claims 1-4 to overcome objections to minor informalities. Accordingly, the objections are withdrawn.
4. Applicant amends claims 1-4 to address rejections under 35 U.S.C. 112, second paragraph, for being indefinite with regard to the "system" claims. Applicant's amendments, however, give rise to new issues of indefiniteness with regard to the system claims. These issues are addressed below under 35 USC 112, 2nd.
5. Applicant adds new claims 150-157, depending from claims 1 and 101 and adding a new independent claim 157. Substantive amendments to claims 1 and 101, and new claim 157 require new search and consideration as follows.

***Response to Arguments***

6. Applicant's arguments filed 4/28/2008 have been fully considered but are moot over new grounds of rejection. However, with respect to relevant arguments applicable to the new grounds:

Applicant argues the rejection of claims 1-4 under 35 U.S.C. 101 is improper because the claimed *system* [as amended, now] embodied on a computer readable medium is statutory subject matter, citing *Eolas Techs., Inc. v Microsoft Corp* as establishing that software per se is statutory subject matter. However, Applicant has amended claims 1-4 to recite a *product* claim rather than a system claim, the product (the computer readable medium) being a physical structure which may impart the claimed functionality to a computer. Accordingly, the rejection of claims 1-4 under 35 U.S.C. 101 are withdrawn.

Applicant argues Linden et al. (US 6,266,649) teaches using a fixed measure of association and therefore cannot teach *selecting, based on an item set containing at least one item of input data, an appropriate measure of association, or selecting, based on the item set, an appropriate measure of association*, thereby (as in claim 3) *utilizing a highest value score of scores applicable to an item as the single score* (Remarks, page 31).

However, Applicant does not precisely claim what Applicant argues. Rather, the claims presented recite, with respect to the limitation argued:

selecting [selects] based on an appropriate measure of association from among the known measures of association, the selection based on known measures of association and an item set containing at least one item of input data;

Performed as a method, Linden et al. suggests the *selecting* step: Although Linden et al. teaches a *fixed* measure of association, it would have been obvious to one of ordinary skill in the art at the time of invention to *first choose* an appropriate measure to serve as the fixed measure of association prior to performing the collaborative filtering method of Linden, as choosing from among different algorithms for measuring similarity in item-based collaborative filtering is known to provide better recommendations. Performed as a *system*, however, though Linden does not expressly teach a *selection component*... for performing the selecting function, other art (applied below) teaches selection component solving the problem of how to choose appropriately among different recommendation components. These points are addressed in the new grounds to follow.

As to the argument regarding *utilizing a highest value score of scores applicable to an item*... Applicant does not precisely claim what Applicant (perhaps) intends as argued. Rather, claim 3 recites: *a multiple-score collaborative filtering evaluation method utilizing a highest value score of scores applicable to an item as a single score;*

Broadly interpreted, this limitation reads on Linden's collaborative filtering method. Even though using a fixed measure of association (appropriately selected as above) Linden finds multiple-scores applicable to an item (the scores associated with

various other items) by choosing from among items with the highest commonality index scores (column 9 from line 34) and then selects the highest value item(s), thereby *utilizing a highest value score of scores applicable to an item as [the] single score.*

Applicant argues for allowability of claims 2 and 4 with respect to limitations previously argued for claim 1 on which claims 2 and 4 depend. Arguments over Linden with respect to claim 1 are addressed above.

7. Accordingly, in response to Applicants amendments and new claims added, the rejections of the prior office action are amended or new grounds entered, including new grounds with respect to 35 U.S.C. 101 as follows.

***Claim Rejections - 35 USC § 101***

8. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9. Claims 101 and 152-156 are rejected under 35 U.S.C. 101 based on Supreme Court precedent, and recent Federal Circuit decisions. For a process to be patentable subject matter under § 101 the process must (1) be tied to another statutory class of invention (such as a particular apparatus) or (2) transform subject matter to a different state or thing. See *Diamond v. Diehr*, 450 US 175, 184 (1981); *Parker v Flook*, 437 US 584, 588 n9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 US 780, 787-88 (1876). If neither of these requirements is met by the claim, the method is not a patent eligible process. To qualify under § 101 as a statutory process, the claim should positively recite the other statutory class (the thing or product) to which it is tied, for example by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state.

In the present case, none of the method (process) claims recite a step transforming subject matter to another state or thing or tied to another statutory class, such as a particular apparatus. Rather, any or all of the steps of the methods may be performed by a human, by hand, or by mental steps. As such, the claimed methods are ineligible for patenting under 35 USC 101.

Appropriate amendment is requested.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

(Claims 101, 152-156, the method claims, being broadest, are addressed first followed by the system claims 1-4, 150, 151 and 157.)

11. Claims 101, 153, 155, and 156 are rejected under 35 U.S.C. 103(a) as being unpatentable over Linden et al. (US Pat. No. 6,216,649, herein "Linden") in view of Karypis ("Evaluation of Item-based Top-N Recommendation Algorithms" 2001, herein "Karypis").

**Claim 101**

Linden teaches a method of data analysis comprising  
*receiving an item set containing at least one item of input data* (see Figure 1 Item 52, the Recommendation Process receiving item(s));

*scoring at least one item of the item set by employing [a] selected measure of association* (see column 11, lines 4-21, *inter alia*: items are scored by a commonality index);

*smoothing at least one item of the item set via a selected smoother* (see column 13 from line 47; esp. column 12 from line 26: "items that were sold to an insignificant number (e.g. <15) of customers are preferably omitted or deleted from the tables, thereby "smoothing" data with too few samples, i.e. "cutoff" smoothing as disclosed);



Linden further teaches combining commonality index values from multiple similarity lists when an item appears on more than one list (column 11, lines 16-21) and explicitly teaches “any of a variety of other methods for evaluating similarities between items could be incorporated into the [similarity] table(s)”, from which the similarity lists are scored (column 13 at line 58). However, while Linden suggests such multiple scoring methods for items on multiple lists and combining those scores for a single item, Linden does not expressly teach:

*selecting an appropriate measure of association from among the known measures of association, the selection is based on known measures of association and the item set, and*

*employing at least one multiple-score collaborative filtering evaluation method to obtain a single score for an item when more than one measure of association score applies to that item.*

Karypis teaches evaluation of collaborative filtering algorithms including evaluation of at least two known similarity measures employed in item-based collaborative filtering (see Section 3.1 “Item Similarity”): *Cosine-based Similarity* and *Conditional Probability-base Similarity*. Karypis compares the two measures by citing performance limitations depending on the grouping and frequency of the underlying item data. That is, Karypis teaches that the measure of association as chosen from among at least two known measures is important to overall performance of an item-based collaborative filter. In view of Karypis teaching the importance of selection of multiple (at least two) different measures of association and Linden’s express suggestion and

capability, it would have been obvious to one of ordinary skill in the art at the time of the invention to at least choose from among the known similarity measures one that best applies to the item data, thereby providing the best recommendation result for the given set of item data.

Further, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement a multiple score collaborative filtering evaluation method based on the measure or measures of association best suited to the item data, combining the scores for items appearing in multiple lists derived from Linden's tables and employing "any of a variety of other methods for evaluating similarities", as this would have improved the confidence and strength of the overall recommendation of Linden's system using the best known and appropriate similarity measures available to the practitioner.

Claim 153

Linden teaches further utilizing a highest value score of scores applicable to an item as the single score (see column 9 from line 34 and column 11 from line 16, esp. column 15 from 16: similar item lists obtained from multiple measures of association are scored and combined or merged base on the highest value score applicable to common items on the item set).

Claim 155

Linden teaches *the selected smoother is selected, based on the item set, from among known smoothers* (column 12 from line 26: "cutoff" smoothing is smoother known in the art).

Claim 156

Linden does not expressly teach *selecting at least one additional measure of association based on the item set and scoring at least one item of the item set by employing the at least one additional measure of association*; however, by the rationale given above for claim 101 with respect to *employing at least one multiple-score collaborative filtering evaluation method to obtain a single score for an item when more than one measure of association score applies to that item*, the act of employing multiple measures of association as suggested by Linden in view of Karypis requires *selecting an additional measure of association*, the *selecting* of the second measure based on the item data for similar advantage as stated above for selecting the *first* measure of association—that of providing the best recommendation result for the given set of item data.

12. Claims 152 and 154 are rejected under 35 U.S.C. 103(a) as being unpatentable over Linden in view of Karypis as applied above to claims 101 and 153, respectively, and further in view of Bradley et al (US Pat. No. 7,194,477).

Claims 152 and 154

Linden teaches or suggests claims 101 and 153 as above; however, Linden does not expressly teach *rules having higher-order item sets*.

Linden teaches recommendations based on sets of items (in a basket of items or “shopping cart”) and determining what items of an item list to recommend based on the scores of multiple items in association with an item of interest (the list item), the multiple

items combined being a stronger indicator of interest based on the users current shopping experience (see column 16, top).

Bradley expressly teaches association rules for "occurrence data" having multiple items on the left side of the rule, the rule defining an association based on multiple items associated to a single item of interest (see Bradley, at least column 2 from line 18 and related formulations at column 12 from line 59 to column 13. line 24).

It would have been obvious to one of ordinary skill in the art at the time of the invention that an item set comprising a higher-order item set wherein more than one item is represented on a left-hand side of an association rule applicable to at least one item in the item set, as suggested by Linden and taught by Bradley, would provide a stronger indication of interest in an item and therefore lead to higher acceptance of recommendations, especially in the case of a shopping cart where items.

13. Claims 1, 3, 150, 151, and 157 are rejected under 35 U.S.C. 103(a) as being unpatentable over Linden et al. (US Pat. No. 6,216,649) in view of in view of Karypis ("Evaluation of Item-based Top-N Recommendation Algorithms") and further in view of Pyo (US Pat. 6,636,836).

Claim 1

Linden in view of Karypis teaches or suggests the collaborative filtering method of claim 101 embodying the automated system on a computer readable medium (see Figure 1 and related discussion RECOMMENDATION SERVICE COMPONENTS); however, Linden does not expressly teach *a measure of association selection*

*component that selects an appropriate measure of association from among the known measures of association, the selection is based on known measures of association and an item set containing at least one item of input data.*

Pyo expressly teaches a Recommendation Manager component (Figures 2-4) that selects among multiple recommendation agents, each of which employs different numerical prediction rating means for recommending items to a user, the Recommendation Manager then generating a final list of recommended items (see Abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to improve Linden with this feature of Pyo, as Pyo teaches a solution to the problem of how to integrate the results of multiple recommendation agents, each employing a different numerical prediction rating (a measure of similarity). The improvement of Linden by Pyo's method of integrating "any of a variety of other methods for evaluating similarities between items" (column 13 at line 58) would have predictability resulted in a more accurate combined list of item scores from which to recommended the most likely items for the user.

### Claim 3

Linden teaches further utilizing a highest value score of scores applicable to an item as the single score (see column 9 from line 34 and column 11 from line 16, esp. column 15 from 16: similar item lists obtained from multiple measures of association are scored and combined or merged base on the highest value score applicable to common items on the item set).

Claim 150

Linden teaches a smoothing component (performed by the Recommendation Components), selecting a smoother, based on the item set, from among known smoothers (column 12 from line 26: "cutoff" smoothing is smoother *known* in the art).

Claim 151

Linden does not expressly teach the measure of association component *selecting at least one additional measure of association based on the item set and scoring at least one item of the item set by employing the at least one additional measure of association*; however, by the rationale given above for claim 101 with respect to *employing at least one multiple-score collaborative filtering evaluation method to obtain a single score for an item when more than one measure of association score applies to that item*, the act of employing multiple measures of association as suggested by Linden in view of Karypis requires *selecting* an additional measure of association, the *selecting* of the second measure based on the item data for similar advantage as stated above for selecting the *first* measure of association—that of providing the best recommendation result for the given set of item data.

Claim 157 recites the collaborative filtering system of claim 1 embodied as means for performing the functions of the components of claim 1 embodied on a computer readable medium, and is similarly rejected for reasons given above.

14. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Linden in view of Karypis and Pyo as applied above to claims 1 and 3, respectively, and further in view of Bradley et al (US Pat. No. 7,194,477).

Claims 2 and 4

Linden in view of Karypis and Pyo teaches or suggests claims 1 and 3 as above, and further Linden teaches recommendations based on sets of items (in a basket of items or “shopping cart”) and determining what items of an item list to recommend based on the scores of multiple items in association with an item of interest (the list item), the multiple items combined being a stronger indicator of interest based on the users current shopping experience (see column 16, top); however, Linden does not expressly teach *association rules having higher-order item sets*.

Bradley expressly teaches association rules for “occurrence data” having multiple items on the left side of the rule, the rule defining an association based on multiple items associated to a single item of interest (see Bradley, at least column 2 from line 18 and related formulations at column 12 from line 59 to column 13. line 24).

It would have been obvious to one of ordinary skill in the art at the time of the invention that an item set comprising a higher-order item set wherein more than one item is represented on a left-hand side of an association rule applicable to at least one item in the item set, as suggested by Linden and taught by Bradley, would provide a stronger indication of interest in an item and therefore lead to higher acceptance of recommendations, especially in the case of a shopping cart where items.

***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Chen (US Pat. Pub. 2004/0176966) teaches automated methods and systems for generating product recommendations based on customer-based dimensional database similarity measures.

Rainsberger et al. (US Pat. 6,865,565) teaches automated methods for integrating different recommendation systems into a rule-based recommendation system.

Delgado et al. (US Pat. 6,801,909) teaches automated methods for integrating recommendations for goods and services based on multiple techniques including collaborative, event-based, content and context-based and user-based profiling.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dave Robertson whose telephone number is (571)272-8220. The examiner can normally be reached on 9 am to 5 pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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